

## REMARKS

Claims 1-63 are pending in the present Application. Claims 1-15, 32, 53-58, and 61-62 have been withdrawn as a result of a restriction requirement. Applicants appreciate the indication that Claim 63 has been deemed allowable. No claims have been amended, added, or canceled, leaving Claims 16-31, 33-52, and 59-60 for consideration.

Reconsideration and allowance of the claims are respectfully requested in view of the following remarks.

### 35 U.S.C. § 112 Rejection

Claims 16-31, 33-52, and 59-60 have been rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. In particular, the Office Action claims that the inclusion of the limitation that the splats have an average diameter of greater than about 0.1 micrometer (micron) is new matter. Applicants respectfully draw the attention of the Examiner to paragraph 22 of the specification, which discloses that the splats have an average diameter of less than or equal to about 2 microns, which is equivalent to 0 to 2 microns. Independent Claims 16, 37, and 59 are particularly limited to an average splat diameter of greater than about 0.1 micron and less than or equal to about 2 microns. A person of ordinary skill in the art would consider this claimed range as lying within the disclosed range of less than or equal to about 2 microns. Accordingly, Applicants assert that the claimed range is supported by the specification and thus does not constitute new matter.

### 35 U.S.C. § 102(b)/103(a) Rejection

Claims 16-23, 26-31, 33-40, and 43-52 have been rejected under 35 U.S.C. § 102(b), as allegedly anticipated by, or in the alternative, under 35 U.S.C. § 103(a), as allegedly obvious over, an article by Padture et al. entitled "Towards Durable Thermal Barrier Coatings with Novel Microstructures Deposited by Solution Precursor Plasma Spray" (Acta Mater. 49 (2001) 2251-2257) (hereinafter "Padture"). Applicants respectfully traverse this rejection.

To anticipate a claim, a reference must disclose each and every element of the claim. *Lewmar Marine v. Varient Inc.*, 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987). See MPEP 2131. Also, to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). See MPEP 2143.03.

Independent Claims 16 and 37 pertain to a material/thermal barrier coating comprising splats having an average diameter of greater than about 0.1 micrometer and less than or equal to about 2 micrometers. Padture fails to teach or suggest this particular splat size. In contrast, Padture teaches a process in which coatings are deposited using solution precursor plasma spray (SPPS). Padture specifically claims that “[t]he most important feature of these coatings [Fig. 2(a)] is the absence of horizontal, strength-degrading “splats” boundaries/cracks” (emphasis added). See the paragraph spanning pages 2253-2254 of Padture. Padture also describes Figure 3(a) as “once again showing a complete lack of “splat” boundaries/cracks” (emphasis added) (Padture, page 2254, 1<sup>st</sup> complete paragraph). Thus, Padture teaches away from forming splats altogether, not just horizontal splats as contended by the Examiner. In addition, Padture discloses that conventional plasma-sprayed thermal barrier coatings, as opposed to coatings formed by its SPPS process, contain splats that are typically several hundreds of microns long. Padture indicates that its SPPS coatings have improved properties over the conventional plasma-spray coatings (abstract of Padture).

In the Office Action addressed herein, the Examiner indicates that Padture teaches that one microstructure disclosed in Padture is a relatively large polycrystalline particle (about 600 nm) containing grains of sizes 50-100 nm (referring to page 2255, last paragraph and Fig. 7(a) of Padture). Applicants respectfully disagree with the Examiner’s contention that the polycrystalline particle referred to in Padture is a splat that has a size within the claimed range. The Examiner appears to be confused regarding the difference between a splat and a grain. To assist the Examiner, Applicants have enclosed herewith definitions of “grain” and “splat” obtained from Davis, J.R., ed. Handbook of Thermal Spray Technology, Material Parks, Ohio: ASM International®, 2004. On page 299 of this reference, “grain” is defined as an individual crystal in

a polycrystalline material, and on page 316, “splat” is defined as a single, thin, flattened, sprayed particle. It is clear from these definitions that the grains in the polycrystalline particle described in Padture would not be considered splats by a person of ordinary skill in the art. Moreover, to simplify things, Applicants would like to make an analogy that the Examiner can more easily understand. In particular, the formation of a splat is similar to throwing a snowball against a wall, which results in the snowball being flattened. When a particle is plasma sprayed on a substrate, it is accelerated and melted as it passes to the substrate, and it flattens like a snowball when it impacts the substrate before hardening again. Based on the foregoing, Applicants assert that the grain size taught by Padture would not be considered a splat size.

Applicants also disagree with the Examiner’s argument that Dr. Maurice Gell’s statements in the previously submitted 37 CFR § 1.132 Declaration are not commensurate with the claims, which contain no limitations drawn to columnar-grain structure. In this Declaration, Dr. Gell explains why the “rounded” aggregate shown in Figure 4(a) of Padture would not be considered a splat having the claimed dimensions, as contended by the Examiner in the Office Action dated November 15, 2006. Dr. Gell describes how a columnar-grain structure is characteristic of a splat and concludes that there is no evidence in Figure 4(a) of a columnar-grain structure. Since the claims are specifically limited to a particular splat size, it should not be necessary to amend the claims to include a columnar-grain structure before the Examiner will take Dr. Gell’s declaration into consideration. Applicants therefore respectfully request that the Examiner rely on Dr. Gell’s declaration in determining how the scope of the claims are different from the teachings of Padture.

In view of the foregoing remarks, Applicants respectfully request reconsideration and withdrawal of the foregoing rejection applied to independent Claims 16 and 37 and dependent Claims 17-23, 26-31, 33-36, 38-40, and 43-52, which depend therefrom.

Second 35 U.S.C. § 103(a) Rejection

Claims 59-60 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Padture as applied to claims 16-23, 26-31, 33-40, and 43-52 above, further in view of U.S. Patent Application Publication No. 2002/0031658 to Chow et al. (hereinafter "Chow").

Independent Claim 59, which pertains to a coating comprising splats, includes the limitation that greater than or equal to about 90% of the splats are splats having an average diameter of greater than about 0.1 micrometer and less than or equal to about 2 microns. As described above, Padture fails to teach or suggest this particular splat size. Chow also fails to teach or suggest splats having this particular size. In contrast, Chow discloses that conventional thermal spraying can form splats having a thickness of at least several microns (see paragraph 45 of Chow), which would be greater than 2 microns. Moreover, Chow describes a thermal spraying technique that uses solution precursors as a feedstock to form coatings made of nanostructured particles which have a diameter of less than about 0.1 micron (Chow, paragraph 44). Therefore, the splats formed by Chow's thermal spraying process have a thickness or dimension of less than about 0.1 micron, which is outside the claimed splat size.

Based on the foregoing remarks, Applicants respectfully request reconsideration and withdrawal of the 35 U.S.C. § 103(a) rejection applied to independent Claim 59 and dependent Claim 60, which depends therefrom.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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